

## Life After Debt

In the year 2000, the U.S. Treasury began actively buying back the public debt; we should all appreciate the tremendous achievement this represents for the Nation as a whole. As the previous section described there are good reasons for our current fiscal discipline and the public savings that accompany it to continue. We must realize however, that a sharp reduction in Federal debt and the possible accumulation of a Federal asset raises at least three important issues. First, investors looking for an asset free of credit risk can no longer count on an abundant supply of U.S. Treasury securities, and Treasury securities may no longer provide a reliable benchmark for other interest rates. Second, the Federal Reserve may have to change the mechanisms by which it conducts monetary policy. Third, continued surpluses after the public debt has been paid off will require the Federal government to acquire assets, either directly or through the Social Security Trust Fund. This raises issues about what kinds of assets might be acquired, and the best way to manage this task.

### Benchmark Issues

The financial services industry has grown tremendously in this country over the past eight years, and done a very good job of handling growth and the increased risks that accompany it. The industry accomplishes this task most fundamentally by separating risks by type, making them easier to evaluate and price. Most investors, creditors and businesses face exchange rate risk, real interest rate risk, and default risks daily. US Treasuries are considered free of default

risk by investors the world over. Because of this reputation, one of the services provided by the Treasury in financing US Government debt has been that of providing a benchmark asset to the financial community. The remarkable liquidity of Treasuries is also a result of the full faith and credit of the United States Government. Holding a liquid asset is valuable because it affords an assurance of convertibility, and thus fast and easy access to capital. Private investors, the Federal Reserve and many foreign central banks have used Treasuries to fulfill their need for a riskless, performing asset with liquidity second only to currency. Together the liquidity and risklessness of Treasuries enable their use as a benchmark to compare and price other, riskier investments. If Treasuries should disappear, markets will look for a substitute to fill these roles.

In fact, since the Treasury's buy back program began, the Swaps market has taken on some of the benchmark role of Treasuries in providing a benchmark interest rate for relative comparisons. A Swap allows a holder of a stream of variable interest rates payments to convert this into a stream of fixed payments for fee. The Swaps market is remarkably liquid, since swaps are agreements between parties and supplies are not limited by the issuance of any one entity. Many financial intermediaries participate in the market at present, allowing a fully articulated yield curve and a vibrant market. In this environment Swaps, which by design deal explicitly with uncertainty, are capable of acting as a partial substitute for the Treasury benchmark. Because Swaps are not US Treasury issues, they will not fully substitute for the Treasury Instrument, they are however highly tradable across parties as the houses that issue them maintain exemplary credit ratings in order to maintain liquidity and thus market share.

Of course it is possible to keep both the benchmark Treasury and allow fiscal surpluses to continue to pay down the national debt. This would require that we diversify the Social Security Trust Fund (investment options and concerns are described below). Under such a scenario, the trust fund would invest in something other than Treasuries, while the federal government could maintain its current fiscal policy and the public market for Treasury instruments. Because the Trust funds would no longer purchase the same quantity of Treasury instruments, the federal government would face declining OASI receipt pass through and a decrease in this finance. The federal government's effective expenditure to receipts ratio would rise.

The Treasury could solve the Fed's short-term problem without involving the Social Security Trust Fund by creating a further Federal investment fund to save for future financial demands- as described later in this section. In several important ways, Treasury securities still represent an ideal instrument for monetary policy. First, current Treasury markets are generally very liquid, so that the Fed can easily purchase and sell securities at market prices. Second, price information is widely available, making these markets highly transparent. Third, the full faith and credit of the U.S. government back Treasury securities; hence, the Fed takes on no credit risk in owning them. By acting soon the federal government can preserve a public debt market through purchases of assets in excess of what is required to soak up present surpluses. In lieu of an increased need to finance the federal budget with Treasury issues, the Federal Reserve will be faced with the dilemma of how to implement Monetary Policy.

## Conducting Monetary Policy

The debt held by the public comprises holdings by the Federal Reserve, foreign governments, and private investors; this is the debt scheduled for elimination by 2012. At current the Fed buys and sells Treasuries to conduct open market operations, through which the Fed to affect bank reserves, short term interest rates, and the money supply. The Fed's conduct of open market operations has been a key to our economic success with strong growth and low inflation so it is important that they have a strategy as the amount of public debt declines. Even before 2012, the Fed will come up against a self-imposed constraint on purchases. On July 5<sup>th</sup>, 2000, in order to help preserve the market for Treasuries, the Federal Reserve placed caps on the amount of individual Treasury issues it would purchase. These caps further limit the Fed's ability to use Treasuries to finance open market operations. If the Fed continues to expand the money supply at the current annual rate of 6 percent its caps may be hit as early as 2003<sup>1</sup>—long before the market for publicly traded Treasuries vanishes.

In principle, the Fed can conduct open market operations on any number of assets including corporate bonds, agency debt, sovereign debt, and even equities.<sup>2</sup> While these assets are feasible instruments for open market operations, none is as liquid as Treasury instruments. It is true that as long as the Fed need not increase or decrease the money supply beyond its supply of Treasuries with great rapidity, the instrument holdings of the Fed need not consist exclusively of Treasury assets. Over time however, as the Economy grows and the Fed's stock of Treasuries mature, the percentage of Treasuries in the Fed's portfolio will decline, requiring a change in Fed procedure for increasing or damping liquidity with rapidity.

<sup>1</sup> The exact date depends on the frequency and composition of Treasury issues.

<sup>2</sup> Of course, the difficulty with using private securities is that one might wish to impose minimum prudential requirements – e.g., corporate debt might be required to be above junk rate. Alternatively, suppose the Fed listed the

There is a well-respected argument<sup>3</sup> that liquidity is self-referential, that the increase in demand for any asset that becomes the new benchmark will yield increased liquidity. There is a concern though, that this liquidity will perhaps further yield an implicit guarantee for any instrument chosen (the logic being that the either the Fed or government might be unwilling to allow the issuer to go bankrupt). Historically Treasuries gained liquidity as a result of this guarantee, opposite to the order suggested above. The Federal Reserve is currently not amenable to letting agency debt become the new benchmark for exactly this reason.<sup>4</sup> The issue is broader than this however, as any private asset which is used to conduct monetary policy will enjoy a large increase in liquidity, an issue the Fed takes quite seriously.

With respect to agency debt, there is a further concern regarding liquidity. A monetary policy conducted with Government Sponsored Enterprise debt would be constrained by the size of the enterprises themselves. In order to provide sufficient issuance to meet the demands of the Fed for a liquid market these Enterprises would have to grow considerably. It's unclear that they would be able to do so within their traditional markets. It is further unclear whether GSEs could effectively enter other financial markets and what kind of interactions between these entities and private institutions in these markets might result. Conducting monetary policy with an

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corporations that were allowed for OMO's; this action might be taken as a signal of approbation. Delisting would take on a heightened importance.

<sup>3</sup> See Reinhart and Sack (2000) for one reference.

<sup>4</sup> Reinhart and Sack (2000) actually note costs as well as benefits from disappearing debt. Using a Blanchard overlapping generations model, they show that disappearing debt, financed through taxes, will induce crowding in of private capital. On the other hand, the switch away from Treasuries as a benchmark will mean, in their view, a disappearance of an infrastructure that lessens the US government's borrowing costs. Hence, when the deficit reappears, borrowing costs would be higher than they would be if Treasuries had remained a benchmark asset. Underpinning their view is the presumption that there are nonlinearities in the market's decision to opt for one benchmark versus another.

instrument that is effected by absolute liquidity constraints, and uncertainty would have its challenges.

The Fed, if granted authorization could use private securities to conduct monetary policy. Private institutions could provide a relatively sanitary solution to the Fed's problem of replacing Treasury securities in the conduct of monetary policy by creating new, very low-risk securities constructed from a pool of private debt securities. Such securities would be packaged in a way similar to mortgage-based securities currently issued by Government Sponsored Enterprises like Freddie Mac and Fannie Mae, but would not be as liquidity constrained and would be better diversified against certain market risks. To package the new instrument, a financial institution could buy a set of high-quality corporate bonds. It would then offer to sell a coupon bond called the Triple-A Plus bond that pays a fixed annual interest rate for the life of the bond. The Triple-A Plus Fund would put up its equity capital and take on the default risk of the underlying corporate bonds. Although not completely risk-free, bonds like the Triple-A Plus bond would entail very little credit risk and would be close substitutes for Treasury securities. With the advent of such an instrument, liquid and transparent markets should develop, given the value of just such a low-risk security to both private markets and the Fed.

The Fed could also supply reserves to the financial sector via discount window lending to banks. This would mark a return to the reserve management strategies used by the Fed many decades ago. In fact the special Y2K lending program of last year was a recent and significant modern use of the discount window to infuse liquidity into the banking system quickly and effectively. The advantage to this strategy is that the Federal Reserve does not have to make

choices concerning which securities to purchase in order to affect open market operations, instead it need only concern itself with what constitutes an acceptable form of collateral for loans.

Before the Fed settles on a policy option, we are likely to witness ever-greater use of short-term operations such as Repos and matched purchases to make temporary adjustments to the money supply, we'll have to wait and see what strategy the Fed takes moving forward.

Regardless of how the Fed proceeds, by 2012 the public debt will be retired according to current projections, leaving the government with net receipts above its expenditures. In order to deal with financial obligations mid century, the government may choose to save, and indeed invest this surplus.

### **Accumulating a Federal Asset**

As discussed earlier, one prudent strategy for addressing the long-term demographic challenge is to continue paying down the deficit and eventually build up a Federal asset from which we can meet future obligations. But what specific kinds of investments should the Federal government hold, and what issues of management are likely to be important? The experiences of state governments and the governments of other countries may provide some guidance.

#### *Investing in Public Fixed Income Securities:*

State and local bonds are exempt from federal taxes. Federal purchases of these obligations that displaced private purchase would therefore increase federal tax revenue all else equal. Another consideration however is that historically state and local bonds have sometimes earned lower returns than their federal counterparts as a result of their tax advantaged status. There is as well a dynamic risk to such a strategy as described by previous experience in Canada.

In 1966, the Canadian Federal government began to invest pension surpluses in non-marketable provincial debt, at the federal long-term bond rate. This interest rate subsidy to the provinces may have encouraged provinces to overextend themselves. There is some further evidence states or provinces may treat such debt purchases as transfers rather than as obligations. For example, although it never actually defaulted, Ontario flatly declared in the late 1970s that it would not repay. Such an approach should raise an additional concern presently. The US Federal government will most likely need to draw down these assets in the face of the demographic pressures mentioned above, just as states and local municipalities face similar fiscal pressures.

#### *Investing in Private Fixed Income Securities*

One vehicle for investment that might be appealing as an asset is the "Triple A" bond described above. Such a bond would be relatively risk free and be could be constructed in relative abundance. Mortgage backed securities are another option as well. The two largest Government Sponsored Enterprises, Freddie Mac and Fannie Mae together account for nearly half of all of the mortgages issued in the United States home mortgage market. Any private instrument we consider will carry some risk. The housing market is unique; by providing

substantial liquidity to a fundamentally supply constrained market, the housing market could experience substantial increases in demand and price. Sweden embarked on a similar course of action in the past with mixed results. In the 1960's the Swedish government purchased debt holdings of government-owned mortgage corporations. This subsidized the housing market with positive consequences for both homeownership rates and household wealth. However, the financial system was very tightly regulated during this time. A subsequent deregulation led to a real estate price bubble that burst in the early 1990s. This fall in asset prices had a significant negative effect on the economy; bad loans were subsequently collected into a special public corporation as part of a government rescue package for the Swedish financial system in the 1990s.

*Investing in equities*

Other governments have pursued a strategy of investing in equities and other financial market offerings, domestically and internationally. Just as the absence of benchmark US debt would, an accumulation and investment of surpluses in financial markets by the US could significantly affect markets both at home and abroad. Of course significant and legitimate concern revolves around governments' ability to passively invest sizable sums in private ventures. The experiences of California and Norway highlight the concerns, especially over time. Any investments should therefore be diversified and clearly regulated. Management must be independent of the government, to avoid any possible conflicts between the interests of the government as a financial investor and its broader public goals. Norway's Petroleum Fund is an endowment to help fund government. Current guidelines set limits on the magnitude of risk the

Fund can incur from exchange rates, markets, interest rates, or credit risk. In addition, there are limits to the shares of the Fund to be invested in stocks or bonds and in the allocation of investments by region. Interestingly, none of the funds can be invested in Norway. Even with such strict guidelines, political concerns have surfaced regarding allocation and management of the Petroleum Fund including critique of specific investments in companies for their lack of environmental standards or abuses of human rights. In addition, there is significant pressure to use the fund to subsidize domestic investment.

Closer to home, the California Public Employees' Retirement System (CalPERS) follows a strategic asset allocation policy that identifies the percentage of the System's funds to be invested in each asset class. It invests in equities and bonds both domestically and worldwide. CalPERS has 9 percent of its total assets invested in California; earmarked through programs such as the CalPERS Single Family Housing Program, Member Home Loan Program, and private equity investments through limited partnership. Equity investments reach beyond state borders and CalPERS is one of the largest private equity investors in the world. CalPERS is well regarded as an investor by stakeholders and market participants alike; however as its state-specific programs illustrate, the investment of funds has not been entirely free from political consideration

*Conclusion, is there life after debt ?*

Given the described concerns with a debt pay-down, many may ask, " is a pay-down still worthwhile?" The answer depends on relative costs and our priorities. If the United States

wishes to preserve the public market for debt, then one or more of the investments above can achieve that end. Of course there is value to paying the debt down as quickly as possible as well – in the form of lower interest expenses. The linchpin cost issue compares the savings from mitigated interest payments to the cost of reestablishing a market for public debt.

Like many nations at present the US faces a demographic shift that precipitates a pension finance shortfall. For this reason we intuitively believe that *“Fiscal policy should avoid optimistic assessments about the room for future tax cuts or spending increases in order to avoid undue stimulus to the economy in the near term and the need for large reversals later on, as the population ages.”* How the Nation will accomplish financing this future shortfall remains to be seen, but is worthy to consider in the current period of surplus.

### Conclusion (coming later)

RECORD TYPE: PRESIDENTIAL (NOTES MAIL)

CREATOR: Charles F. Stone ( CN=Charles F. Stone/OU=CEA/O=EOP [ CEA ] )

CREATION DATE/TIME: 4-DEC-2000 15:43:30.00

SUBJECT: RE: erp draft

TO: Martin N. Baily ( CN=Martin N. Baily/OU=CEA/O=EOP@EOP [ CEA ] )

READ:UNKNOWN

TEXT:

David's e-mail has his comments included in it. This is the version that was sent over to him.

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----- Forwarded by Charles F. Stone/CEA/EOP on 12/04/2000  
03:41 PM -----

David.Wilcox@do.treas.gov

12/04/2000 12:03:50 AM

Record Type: Record

To: Charles F. Stone/CEA/EOP

cc: See the distribution list at the bottom of this message

Subject: RE: erp draft

Chad:

Attached are some comments. Could you give me the earliest possible reading

as to whether you intend to retain this section? If you do, then I would once again strongly advise (as I mentioned to Martin on Friday) that you get

Gene's affirmative approval on this section (this is quite different from interpreting the absence of a negative reaction as acquiescence); also, I will want, in that case, to get Larry's affirmative approval. Finally, you should solicit comments from my colleagues in Domestic Finance. They will come at these questions from a different direction than I do. I am herewith

taking the liberty of transmitting my annotated copy to Gary and Lee.

- life after debt (current).doc

Message Copied

To:

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===== ATTACHMENT 1 =====

ATT CREATION TIME/DATE: 0 00:00:00.00

### TEXT:

Unable to convert NARMS201:[ATTACH.D29]ARMS22000WSCK.001 to ASCII,  
The following is a HEX DUMP:

## Life after Debt

### Basic issues

1. You have no unequivocal statement here in the first paragraph that the payoff of the debt is a good thing, notwithstanding the challenges it presents.
2. I have a hard time believing that this is the time and the place to broach the issue of what happens after 2012.
3. There is no clear and confident statement that financial markets are rapidly evolving to deal with the possible demise of the Treasury market, and should ultimately have no trouble dealing with that evolution within the timeframe currently contemplated.
4. The section on monetary policy should include a simple statement to the effect that there is nothing essential in the use of Treasury securities for the purpose of effectuating monetary policy. While Treasuries have some evident advantages, other securities could be used, and the only essential requirement is that the Fed be able to buy and sell SOMETHING, so as to be able to expand and contract its balance sheet, and hence control the money supply.

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The year 2000 marked a turning point in Federal debt management, as the Treasury began actively buying back the public debt instead of reducing the outstanding stock simply by not rolling over maturing issues, being a net issuer of new debt [Note that we have not been a "net issuer of new debt" for three years – for as long as we have been running unified surpluses]. There is now a With the very real possibility that surpluses will continue for many years into the future – that is that now be the norm, the Treasury will most likely continue to take in more cash

than it disburses and the public debt will continue to shrink [need to indicate more clearly the equivalence between the various parts of the sentence]. Once the debt is eliminated, and this occurs fairly soon under current projections, a Federal asset will begin to accumulate [\*\*\*]. A sharp reduction in Federal debt and subsequent accumulation of a Federal asset raises at least three important issues [this "qualification" needs to be preceded by an unequivocal statement that the debt reduction is a good thing]. First, investors looking for an asset free of credit risk will no longer be able to count on an abundant supply of U.S. Treasury securities, and Treasuries will no longer provide a benchmark for pricing more risky assets or assessing economic and financial market conditions. Second, the Federal Reserve may have to change the mechanisms by which it conducts monetary policy if there is no longer an abundant supply of Treasury securities. Third, the accumulation of a Federal asset raises issues about what kinds of assets might be acquired and the best way to manage them.

### Benchmark Issues

Because of their abundant supply and because they are backed by the full faith and credit of the U.S. government, Treasury securities have traditionally supplied investors with an asset that is highly liquid and free of default risk. Treasuries provide private investors with a convenient financial vehicle for hedging risk, an interest bearing hedge against risk and an asset that can readily be converted into cash. The Federal Reserve and many foreign central banks also hold Treasuries and use them in their official operations. By running surpluses instead of deficits, the Federal government will be shrinking rather than expanding the supply of this

**Comment [DG1]:** Aren't there really two uses for the benchmark? One is to have a base on which to add a risk premium in order for the market to set other interest rates. The second is to evaluate financial market conditions through the yield curve.

valued financial asset for the first time in recent history. [This last sentence has to tone of suggesting that we're doing something stupid by running those darned surpluses.]

Treasury securities have an additional role to play in modern financial markets. As a safe and liquid asset, they have provided a benchmark for determining and assessing interest rates on other assets that are less liquid or less safe. [For example, new corporate debt is typically marketed in terms of its yield relative to that of a particular Treasury issue (rather than at a specific price or yield), and the performance of corporate bonds is often assessed relative to that of Treasuries. Thus, changes in the pricing of the credit risk associated with other financial instruments (the spread between their yield and that of Treasuries) can be separated from changes in interest rates generally (as represented by changes in the yield on Treasuries).]

Comment [JG2]: What follows comes from Fleming, NY Fed, pp 429-30 and FRB bulletin, December 1999

Market participants also use Treasuries as part of a hedging strategy to protect against interest rate risk when taking positions in other fixed-income securities. For example, a securities dealer with a long position in mortgage-backed securities could simultaneously take a short position in Treasuries (by selling securities that the dealer has borrowed). An increase in interest rates generally would reduce the value of the mortgage-backed securities, but it would also reduce the cost of acquiring the Treasuries needed to close out the short position pay back the loan. With such a hedge, the dealer would be exposed only to the specific risk associated with the mortgage-backed securities. This ability to hedge and separate specific credit risk from general interest rate risk has been important in the development of a sophisticated set of instruments for pricing and allocating risk that has allowed a dramatic expansion of financial markets both nationally and globally.

With the prospect of a shrinking public debt, Treasuries are likely to become less reliable as a benchmark, and financial markets will have to evolve – and indeed are already in the process of doing so ~~may have to find a substitute~~. In fact, [after the Treasury announced its plans for buying back Federal debt last year] ~~[this attributes too much causality to the buyback announcement itself – my understanding is that this evolution has been underway for longer than that]~~ and financial markets began to believe that surpluses were likely to continue, the “swaps” market emerged as an alternative to a Treasury market that was already showing the effects of uncertainties about future supply conditions. A swap involves the exchange of a stream of variable interest rate payments, usually tied to the London Inter Bank Offer Rate (LIBOR) for a stream of fixed payments, for a fee. Swaps can be for durations ranging from a few months to many ~~years~~. For example, one party to a swap may expect to receive a variable stream of payments tied to the LIBOR (and an implicit principal balance) over the next 5 years but would prefer the certainty of a fixed payment. The second party agrees to pay a fixed periodic amount in exchange for that variable stream of payments. The swap rate determined in the market is the amount of the fixed payment computed as a percent of the implicit principal. Because there is no underlying asset tied to the issuance of a particular entity (as is the case with Treasuries), the supply of swaps can be quite elastic, requiring only a willing party on each side.

Many financial intermediaries participate in the swaps market at present, allowing a fully articulated yield curve (that mimics the durations of the current Treasury Yield curve) and a vibrant market ~~[I think you would be better served by a simple statement to the effect that the swaps market is deep and liquid. That's more the point, rather than that there are many~~

Comment [E3]: we can be more specific

intermediaries participating]. The depth of the market is not encumbered by the issuance needs of any one entity but is instead tied to the value of increased certainty[this sentence is opaque to me]. In this environment Swaps, which by design deal explicitly with uncertainty, are capable of acting as a partial substitute for Treasuries as a benchmark [I don't think the point you're making is really well focused. You're pointing to two manifestations of uncertainty – one associated with the possible demise of the Treasury market, and the other pertaining to the replacement of variable-rate payments with fixed-rate ones. These are not equivalent notions.]. At present swap rates are occasionally subject to supply-driven distortions, however the notional size of the interest rate swap market is growing quickly, expanding by \$4 trillion, or roughly 9 percent in the first half of this year and 22 percent in the year prior. Because swaps are not U.S. Treasury issues, they will not fully substitute for the Treasury instrument. They are however, highly tradable across parties as the houses that issue them take steps to insure exemplary credit ratings in order to maintain liquidity and thus market share.

The securities of large government-sponsored enterprises (GSEs) are an alternative to swaps as a substitute for the benchmark functions of Treasury securities. [This is a sensitive issue that you so get affirmative clearance on from my colleagues in Domestic Finance.] GSEs are privately owned companies that operate under Federal charters. They are not part of the Federal government and their securities are not federally guaranteed. Nevertheless, the debt securities issued by GSEs are perceived as being quite safe. Recently, the largest GSEs, Fannie Mae and Freddie Mac, have begun to structure and time their offerings in ways that might make them attractive as benchmarks. They have also made their securities more available and

**Comment [E4]:** July Humphry Hawkins Report from the Fed.

**Comment [E5]:** BIS estimate from their press release on the Global OTC derivatives growth.

**Comment [E6]:** Conversation with Tom Simpson Associate Director, Research and Statistics Fed BoG 452-3546  
According to Tom, these companies create separate corporate entities to shield Swaps businesses from other market risks as well as providing outstanding collateral and care within the Swaps business.

attractive to overseas investors. As will be discussed further in the next section, however, there are still some questions about the limitations of agency debt as a substitute for Treasuries.

### Conducting Monetary Policy

While a large supply of Treasury securities is valuable to private financial markets, it is central to the mechanism currently used by the Federal Reserve to conduct monetary policy. In particular, the Fed sets a target for the federal funds rate (the rate at which banks make uncollateralized overnight loans to each other) and uses open market operations (purchases and sales of Treasury securities or equivalent actions) to keep the federal funds rate close to that target. In the short run, when the Fed wants to tighten monetary conditions, it raises the target federal funds rate and sells securities, which reduces banks' reserves and hence their capacity to make loans. To ease monetary conditions, the Fed lowers its target federal funds rate and buys securities, injecting reserves into the system.

Over time, in a growing economy, the Fed tends to be a net purchaser of securities in order to accommodate the needs of a growing economy for more bank reserves and greater lending capacity. [Check the preceding sentence carefully. My impression is that within the last several years, required reserves (at least, and possibly total reserves) have been falling like a rock, as banks have implemented so-called sweep accounts designed to minimize their reserve liability. It may be that the statement is correct if applied to some aggregate that includes currency rather than reserves?] One implication of a shrinking public debt is that the Fed will come to own an increasing fraction of the outstanding debt. In fact, in order to help preserve the

market for Treasuries, the Fed placed caps on the amount of individual Treasury issues it would purchase last July. While such caps help preserve a private market for Treasuries, they limit the Fed's ability to use Treasuries to conduct monetary policy. It is estimated that if the Fed provides sufficient reserves for the money supply to grow at 6 percent annually (about in line with nominal GDP), the Fed will bump up against its self-imposed caps on Treasury holdings as early as 2003—long before the supply of publicly traded Treasuries vanishes.

Recently, in part because the stock of Treasuries is no longer expanding, the Fed has come to rely more on “repurchase agreements,” or “repos” as a means to increase and decrease reserves as a part of ongoing operations. One party to a repo transaction simultaneously sells a particular security to a counterparty and agrees to repurchase that security at a specified price at a later date, often the next ~~week~~ day. The Fed can use such temporary sales to reduce reserves and tighten monetary conditions. The term “reverse repo” describes the other side of the same transaction. Such temporary purchases by the Fed inject reserves and ease monetary conditions. Typically the Fed uses Treasury securities as collateral when engaging in repos and reverse repos. These “short-term” transactions can extend for ~~months~~ and vary the money supply substantially.

Comment [E7]: FRB bulletin Dec 1999, p 297.

Comment [E8]: Maximum term was expanded to 60 days in 1998. Fed document on Monetary Policy, Chapter 2.

Comment [JG9]: Fleming, et al. (2000), p. 33.

While useful at present, repos do not offer a long-term answer for how to conduct monetary policy in the face of a rapidly shrinking supply of Treasuries. One possibility is to find an alternative asset for conducting open market operations. Another is to turn to a different mechanism for conducting monetary policy.

*Alternative assets.* Treasury securities are not the only possible asset for conducting monetary policy. Indeed, the Fed in the past has used other assets to conduct policy, including gold. Today, sovereign debt, corporate bonds, GSE debt, and even equities are all theoretical candidates to replace Treasuries. While these assets are feasible instruments for open market operations, none is as liquid as Treasury instruments. Insufficient liquidity can be a problem in those situations where the Fed needs to make substantial transactions quickly, such as in a financial liquidity crisis such as the October 1987 stock market crash. At present, the required supply of Treasuries is somewhat less than the total financial assets held by the Fed. This might suggest that the Fed could purchase other assets to expand liquidity while maintaining contingency strategies that rely on the Treasury market. Even should this be the case however, over time as the economy grows and the Fed's stock of Treasuries matures, both the percentage of Treasuries in the Fed's portfolio and the active market in Treasuries will shrink. This is part of the motivation at present for a change in Fed procedures affecting rapid changes in reserves.

Several observers have noted that any asset that the Fed decides to use in conducting monetary operations will enjoy increased demand, and hence enhanced liquidity. Increasing the liquidity of a security not issued by the Federal government in this way raises a number of concerns. First, the enhanced liquidity as a result of Fed purchases may be derived in part from an implicit expectation of Federal guarantee for the chosen instrument. This is problematic as such a "guarantee" would arise from the status of the instrument in monetary policy rather than from its underlying creditworthiness. Second, Fed participation in the market for a security may crowd out private participants. Third, in response to the increased demand for any specific security as a result of Fed participation, issuers may increase supplies beyond what is

**Comment [E10]:** Required for what some estimated requirement for liquidity?

**Comment [JG11]:** See Reinhart and Sack (2000) for one reference.

**Comment [JG12]:** Suggest putting this footnote somewhere in the borrowing section, as opposed to "monetary" section  
done JSS

appropriate. Fourth, should economic or financial conditions require the Fed to increase or decrease reserves rapidly, any single asset being used to conduct monetary policy would see its supply change drastically and suffer a large asymmetric shock as compared to the economy as a whole. All of these concerns arise in the case of GSE debt issued by Fannie Mae and Freddie Mac, notwithstanding their efforts to increase the liquidity of their issues.

Another among a wide variety of possibilities to replace Treasuries in the conduct of monetary policy, if the Fed were granted the authorization to use them, would be newly created private securities. If the demand were there, for example, private institutions could construct very low-risk securities constructed from a pool of private debt securities. Such securities would be packaged in a way similar to mortgage-backed securities currently issued by GSE's, but would not be as liquidity constrained and would be better diversified against certain market risks. To package the new instrument, a financial institution could purchase a set of high-quality corporate bonds. It could then offer to sell a "triple-A-plus" bond, with regular interest payments and a fixed annual interest rate for the life of the bond. The institution would put up its equity capital and take on the default risk of the underlying corporate bonds. Although not completely risk-free, such triple-A-plus securities would entail limited credit risk and would be close substitutes for Treasury securities. To the extent that the market valued such an instrument, especially in the absence of a large supply of Treasuries, a liquid and transparent market could well develop.

*Alternative monetary policy instruments.* Open market operations are the main instrument for conducting monetary policy, but there are other, less widely used instruments that could be

considered. These include use of the discount window, changes in reserve requirements, and even moral suasion.

[explain what discount window operations are] An increase in the use of discount window lending to banks would mark a return to the reserve management strategies used many decades ago. The special Y2K lending program of last year was a recent and significant modern use of the discount window to infuse liquidity into the banking system quickly and effectively. An advantage of using the discount window is that the Fed does not have to make choices about which securities to purchase in order to effect open market operations; instead it can focus on specifying what constitutes an acceptable form of collateral for loans. Nevertheless, questions remain about such an approach. Defining acceptable collateral is a significant decision. In addition, we have little experience with discount window operations in today's economy. The successful Y2K lending program was a coordinated and timed response to an anticipated event, while the ability to use discount window operations to affect overall credit availability is subject to uncertain linkages.

Besides open market operations and the discount window, the Fed can manage credit conditions by changing the amount of reserves a bank is required to hold against its deposits. In practice, however, reserve ratios have been adjusted infrequently. Moreover, innovations in the 1990s such as the use of retail sweeps [need to describe what sweeps are] have substantially enhanced banks' abilities to manage reserves and keep them as low as possible. On the one hand, these innovations mean that changes in reserve requirements should have an immediate impact on banks lending capacity since there is little slack to absorb required changes in

reserves. On the other hand, these innovations signal that banks are more acutely aware of the cost of required reserves, and that they are likely to take all available steps to reduce the liability that any increase in the reserve ratio might represent. The potential for continued financial innovation might reduce the effectiveness of this instrument should the Board decide to more actively manage credit using this instrument. Finally the ability to expand credit with this instrument is constrained by the need for adequate reserve balances.

Finally, the Fed has some influence simply through its communications, or so-called moral suasion. The Fed communicates to markets through the announcements of the Federal Open Market Committee, speeches by members the Board of Governors, and to a lesser extent, the research and analysis of both financial and goods markets conducted in various publications, including the Federal Reserve Bulletin. Moral suasion is an important tool at present, as it increases the transparency of monetary policy by aligning market expectations of Fed actions to the opinion of the Chairman and Board of Governors. The most common modern use of this tool is the Federal Open Market Committee's press release, which along with announcing a target for the federal funds rate often includes an analysis of the economy and "bias" or predominant concern of the Board. Because meetings are scheduled and announced well in advance financial markets anticipate press releases, and look to them for guidance on Fed policy. Fed transparency will continue to be of value to markets regardless of the remaining makeup of monetary policy. However, at the end of the day, the effectiveness of moral suasion is a function of the effectiveness of the Fed's ability to tighten and relax credit conditions effectively.

Decisions about which, if any alternative asset might prove to be an acceptable substitute for Treasury securities in the conduct of open market operations or whether a different instrument entirely should be used for the conduct of monetary policy are complicated and require careful attention. The Federal Reserve is currently conducting a system-wide review of these questions in order to be prepared for a possible sharp reduction or elimination in the supply of Treasury securities.

#### Accumulating a Federal Asset

If current projections prove accurate, the Federal debt held by the public (which includes holdings by the Federal Reserve) will be eliminated in 2012 [need to clarify that this is under the budget POLICY proposals of the Clinton Administration as reported in the 1999 Mid-Session Review]. Subsequent surpluses will have to be invested and wise choices regarding initial investment and subsequent management will help ensure that the Federal government is prepared to meet the future obligations described earlier in this chapter. In fact, the Federal government could make such decisions before the debt held by the public is exhausted by purchasing alternative assets—either inside or outside the Social Security system—and issuing debt to finance those purchases. [This sentence really compounds the difficulty of this section – by taking an arithmetic necessity and adding a discretionary element to it, and hence bringing it forward in time.] Such actions could preserve an active Treasury market even as the net public debt was paid down.]

Whether the Federal government purchases assets sooner, in order to maintain the supply of Treasury securities outstanding, or later simply because it has no more debt to retire and is still

**Comment [E13]:** Reinhart and Sack (2000) actually note costs as well as benefits from disappearing debt. Using a Blanchard overlapping generations model, they show that disappearing debt, financed through taxes, will induce crowding in of private capital. On the other hand, the switch away from Treasuries as a benchmark will mean, in their view, a disappearance of an infrastructure that lessens the US government's borrowing costs. Hence, when the deficit re-appears, borrowing costs would be higher than they would be if Treasuries had remained a benchmark asset. Underpinning their view is the presumption that there are nonlinearities in the market's decision to opt for one benchmark versus another.

running surpluses, it will have to decide what kinds of assets to acquire. Broadly speaking, the choices are: public fixed income securities, such as State and local government obligations; private fixed income securities, including GSE instruments; and equities. The experience of foreign and state governments may provide a useful perspective on these choices.

*Public Fixed Income Securities.* The Federal government could purchase State and local bonds.

Because the interest earned on these securities is exempt from Federal income taxes, Federal purchases that replaced private purchases would increase Federal tax revenue, all else equal.

However, State and local bonds have at times in the ~~past~~ earned lower returns than Treasuries due to their tax-exempt status. If such a situation were to occur, the Federal government would be paying more on the Treasury debt it issued to pay for these bonds than it would be earning on the bonds themselves [I don't think this statement is a logical necessity, since it could be that the credit risk of the issuer is sufficient to lift the rate on state and local debt above the Treasury rate.] The statement that I think is unquestionably true is that, for equivalent amounts of credit risk, the Federal government is better off financially when it purchases the fully taxable rather than the tax-exempt security]. Finally, such securities carry credit risk.

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Canada provides an illustration of some of the issues that could arise. In 1966, the Canadian Federal government began to invest pension surpluses in non-marketable provincial debt, at the federal long-term bond rate. This interest rate subsidy to the provinces may have encouraged provinces to overextend themselves. Moreover, although it never actually defaulted, Ontario flatly declared in the late 1970s that it would not repay its obligations. Such an approach should raise an additional concern presently. The Federal government will most likely need to

draw down these assets in the face of the demographic pressures mentioned above, just as states and local municipalities face similar fiscal pressures.

*Private Fixed Income Securities.* Some of the assets described earlier as candidates for use in open market operations by the Fed, such as triple-A-plus securities or GSE issues, might also serve as investment vehicles for the national asset. But these assets are subject to the same concerns raised in the earlier context. For example, Fannie Mae and Freddie Mac together account for nearly half of all of the mortgages issued in the U.S. home mortgage market and the housing market could experience substantial increases in demand and price. [??? I missed something. If the Federal govt is purchasing, won't that drive FM's costs down?]

In the 1960s the Swedish government purchased the debt of government-owned mortgage corporations. The implicit subsidy to the housing market increased homeownership rates and household wealth. However, the financial system was very tightly regulated during this time. A subsequent deregulation led to a real estate price bubble that burst in the early 1990s. The resulting fall in asset prices had a significant negative effect on the economy; bad loans were subsequently collected into a special public corporation as part of a government rescue package for the Swedish financial system in the 1990s.

*Equities.* Both U.S. state and foreign governments have pursued a strategy of investing in equities and other financial market offerings. The key issue for the Federal government is whether it could make substantial investments in the private market without creating undue distortions. The experiences of California and Norway highlight the concerns, especially over

time. Any investments should therefore be diversified and clearly regulated. Management must be independent of the government, to avoid any possible conflicts between the interests of the government as a financial investor and its broader public goals. Norway's Petroleum Fund is an endowment to help fund government. Current guidelines set limits on the magnitude of risk the Fund can incur from exchange rates, markets, interest rates, or credit risk. In addition, there are limits to the shares of the Fund to be invested in stocks or bonds and in the allocation of investments by region. Interestingly, none of the funds can be invested in Norway. Even with such strict guidelines, political concerns have surfaced regarding allocation and management of the Petroleum Fund including critique of specific investments in companies for their lack of environmental standards or abuses of human rights. In addition, there is significant pressure to use the fund to subsidize domestic investment.

Closer to home, the California Public Employees' Retirement System (CalPERS) follows a strategic asset allocation policy that identifies the percentage of the System's funds to be invested in each asset class. It invests in equities and bonds both domestically and worldwide. CalPERS has 9 percent of its total assets invested in California; earmarked through programs such as the CalPERS Single Family Housing Program, Member Home Loan Program, and private equity investments through limited partnership. Equity investments reach beyond state borders and CalPERS is one of the largest private equity investors in the world. CalPERS is well regarded as an investor by stakeholders and market participants alike; however as its state-specific programs illustrate, the investment of funds has not been entirely free from political consideration.

## Conclusion

Macroeconomic performance in 2000 continued to illustrate the benefits that have accrued to the United States from a combination of sound policies and a blossoming of technological opportunities. Strong growth, accelerating productivity, low unemployment, and stable inflation continue to characterize the longest economic expansion on record. The fiscal stance of the Federal government has been completely turned around from one of spiraling deficits to one in which it is possible to contemplate the elimination of the public debt. The critical task now is to maintain the fiscal discipline that has been achieved and focus on the need to have adequate resources available for the coming demographic challenge. [Transition to chapter three pointing to the opportunities the New Economy may offer to make the task easier]

## Life after Debt

The year 2000 marked a turning point in Federal debt management, as the Treasury began actively buying back the public debt instead of being a net issuer of new debt. With the very real possibility that surpluses will now be the norm, the Treasury will most likely continue to take in more cash than it disburses and the public debt will continue to shrink. Once the debt is eliminated, and this occurs fairly soon under current projections, a Federal asset will begin to accumulate. A sharp reduction in Federal debt and subsequent accumulation of a Federal asset raises at least three important issues. First, investors looking for an asset free of credit risk will no longer be able to count on an abundant supply of U.S. Treasury securities and Treasuries will no longer provide a benchmark for pricing more risky assets or assessing economic and financial market conditions. Second, the Federal Reserve may have to change the mechanisms by which it conducts monetary policy if there is no longer an abundant supply of Treasury securities. Third, the accumulation of a Federal asset raises issues about what kinds of assets might be acquired and the best way to manage them.

### Benchmark Issues

Because of their abundant supply and because they are backed by the full faith and credit of the U.S. government, Treasury securities have traditionally supplied investors with an asset that is highly liquid and free of default risk. Treasuries provide private investors with an interest-bearing hedge against risk and an asset that can readily be converted into cash. The

**Comment [JG1]:** Aren't there really two uses for the benchmark. One is to have a base on which to add a risk premium in order for the market to set other interest rates. The second is to evaluate financial market conditions through the yield curve.

Federal Reserve and many foreign central banks also hold Treasuries and use them in their official operations. By running surpluses instead of deficits, the Federal government will be shrinking rather than expanding the supply of this valued financial asset for the first time in recent history.

Treasury securities have an additional role to play in modern financial markets. As a safe and liquid asset, they have provided a benchmark for determining and assessing interest rates on other assets that are less liquid or less safe. For example, new corporate debt is typically marketed in terms of its yield relative to that of a particular Treasury issue (rather than at a specific price or yield), and the performance of corporate bonds is often assessed relative to that of Treasuries. Thus, changes in the pricing of the credit risk associated with other financial instruments (the spread between their yield and that of Treasuries) can be separated from changes in interest rates generally (as represented by changes in the yield on Treasuries).

Market participants also use Treasuries as part of a hedging strategy to protect against interest rate risk when taking positions in other fixed-income securities. For example, a securities dealer with a long position in mortgage-backed securities could simultaneously take a short position in Treasuries (by selling securities that the dealer has borrowed). An increase in interest rates generally would reduce the value of the mortgage-backed securities, but it would also reduce the cost of acquiring the Treasuries needed to pay back the loan. With such a hedge, the dealer would be exposed only to the specific risk associated with the mortgage-backed securities. This ability to hedge and separate specific credit risk from general interest rate risk has been important in the development of a sophisticated set of instruments for pricing and

Comment [DG2]: What follows comes from  
Fleming, NY Fed, pp. 129-30 and FRB bulletin,  
December 1999

allocating risk that has allowed a dramatic expansion of financial markets both nationally and globally.

With the prospect of a shrinking public debt, Treasuries are likely to become less reliable as a benchmark, and financial markets may have to find a substitute. In fact, after the Treasury announced its plans for buying back Federal debt last year and financial markets began to believe that surpluses were likely to continue, the "swaps" market emerged as an alternative to a Treasury market that was already showing the effects of uncertainties about future supply conditions. A swap involves the exchange of a stream of variable interest rate payments, usually tied to the London Inter Bank Offer Rate (LIBOR) for a stream of fixed payments, for a fee. Swaps can be for durations ranging from a few months to many ~~years~~. For example, one party to a swap may expect to receive a variable stream of payments tied to the LIBOR (and an implicit principal balance) over the next 5 years but would prefer the certainty of a fixed payment. The second party agrees to pay a fixed periodic amount in exchange for that variable stream of payments. The swap rate determined in the market is the amount of the fixed payment computed as a percent of the implicit principal. Because there is no underlying asset tied to the issuance of a particular entity (as is the case with Treasuries), the supply of swaps can be quite elastic, requiring only a willing party on each side.

Many financial intermediaries participate in the swaps market at present, allowing a fully articulated yield curve (that mimics the durations of the current Treasury Yield curve) and a vibrant market. The depth of the market is not encumbered by the issuance needs of any one entity but is instead tied to the value of increased certainty. In this environment Swaps, which by

Comment [E3]: we can be more specific

design deal explicitly with uncertainty, are capable of acting as a partial substitute for Treasuries as a benchmark. ~~At present swap rates are occasionally subject to supply-driven distortions.~~ however the notional size of the interest rate swap market is growing quickly, expanding by \$4 trillion, or roughly 9 percent in the first half of this year and 22 percent in the year prior. Because swaps are not U.S. Treasury issues, they will not fully substitute for the Treasury instrument. They are however, highly tradable across parties as the ~~houses that issue them take steps to insure exemplary credit ratings~~ in order to maintain liquidity and thus market share.

The securities of large government-sponsored enterprises (GSEs) are an alternative to swaps as a substitute for the benchmark functions of Treasury securities. GSEs are privately owned companies that operate under Federal charters. They are not part of the Federal government and their securities are not federally guaranteed. Nevertheless, the debt securities issued by GSEs are perceived as being quite safe. Recently, the largest GSEs, Fannie Mae and Freddie Mac, have begun to structure and time their offerings in ways that might make them attractive as benchmarks. They have also made their securities more available and attractive to overseas investors. As will be discussed further in the next section, however, there are still some questions about the limitations of agency debt as a substitute for Treasuries.

### Conducting Monetary Policy

While a large supply of Treasury securities is valuable to private financial markets, it is central to the mechanism currently used by the Federal Reserve to conduct monetary policy. In particular, the Fed sets a target for the federal funds rate (the rate at which banks make

**Comment [E4]:** July Humphry Hawkins Report from the Fed.

**Comment [E5]:** BIS estimate from their press release on the Global OTC derivatives growth.

**Comment [E6]:** Conversation with Tom Simpson Associate Director, Research and Statistics Fed BOC 452-3546  
According to Tom, these companies create separate corporate entities to shield Swaps businesses from other market risks as well as providing outstanding collateral and care within the Swaps business.

uncollateralized overnight loans to each other) and uses open market operations (purchases and sales of Treasury securities or equivalent actions) to keep the federal funds rate close to that target. In the short run, when the Fed wants to tighten monetary conditions, it raises the target federal funds rate and sells securities, which reduces banks' reserves and hence their capacity to make loans. To ease monetary conditions, the Fed lowers its target federal funds rate and buys securities, injecting reserves into the system.

Over time, in a growing economy, the Fed tends to be a net purchaser of securities in order to accommodate the needs of a growing economy for more bank reserves and greater lending capacity. One implication of a shrinking public debt is that the Fed will come to own an increasing fraction of the outstanding debt. In fact, in order to help preserve the market for Treasuries, the Fed placed caps on the amount of individual Treasury issues it would purchase last July. While such caps help preserve a private market for Treasuries, they limit the Fed's ability to use Treasuries to conduct monetary policy. It is estimated that if the Fed provides sufficient reserves for the money supply to grow at 6 percent annually (about in line with nominal GDP), the Fed will bump up against its self-imposed caps on Treasury holdings as early as 2003—long before the supply of publicly traded Treasuries vanishes.

Recently, in part because the stock of Treasuries is no longer expanding, the Fed has come to rely more on "repurchase agreements," or "repos" as a means to increase and decrease reserves as a part of ongoing operations. One party to a repo transaction simultaneously sells a particular security to a counterparty and agrees to repurchase that security at a specified price at a later date, often the next ~~day~~. The Fed can use such temporary sales to reduce reserves and

Comment (E7): FRB bulletin Dec 1999, p 297.

tighten monetary conditions. The term "reverse repo" describes the other side of the same transaction. Such temporary purchases by the Fed inject reserves and ease monetary conditions. Typically the Fed uses Treasury securities as collateral when engaging in repos and reverse repos. These "short-term" transactions can extend for ~~months~~, and vary the money supply substantially.

**Comment [E8]:** Maximum term was expanded to 60 days in 1998. Fed document on Monetary Policy, Chapter 2.

**Comment [JG9]:** Fleming, et al<sup>16</sup> (2000), p.35.

While useful at present, repos do not offer a long-term answer for how to conduct monetary policy in the face of a rapidly shrinking supply of Treasuries. One possibility is to find an alternative asset for conducting open market operations. Another is to turn to a different mechanism for conducting monetary policy.

*Alternative assets.* Treasury securities are not the only possible asset for conducting monetary policy. Indeed, the Fed in the past has used other assets to conduct policy, including gold. Today, sovereign debt, corporate bonds, GSE debt, and even equities are all theoretical candidates to replace Treasuries. While these assets are feasible instruments for open market operations, none is as liquid as Treasury instruments. Insufficient liquidity can be a problem in those situations where the Fed needs to make substantial transactions quickly, such as in a financial liquidity crisis such as the October 1987 stock market crash. At present, the ~~required~~ supply of Treasuries is somewhat less than the total financial assets held by the Fed. This might suggest that the Fed could purchase other assets to expand liquidity while maintaining contingency strategies that rely on the Treasury market. Even should this be the case however, over time as the economy grows and the Fed's stock of Treasuries matures, both the percentage

**Comment [E10]:** Required for what—some estimated requirement for liquidity?

of Treasuries in the Fed's portfolio and the active market in Treasuries will shrink. This is part of the motivation at present for a change in Fed procedures affecting rapid changes in reserves.

Several observers have noted that any asset that the Fed decides to use in conducting monetary operations will enjoy increased demand, and hence enhanced liquidity. Increasing the liquidity of a security not issued by the Federal government in this way raises a number of concerns. First, the enhanced liquidity as a result of Fed purchases may be derived in part from an implicit expectation of Federal guarantee for the chosen instrument. This is problematic as such a "guarantee" would arise from the status of the instrument in monetary policy rather than from its underlying creditworthiness. Second, Fed participation in the market for a security may crowd out private participants. Third, in response to the increased demand for any specific security as a result of Fed participation, issuers may increase supplies beyond what is appropriate. Fourth, should economic or financial conditions require the Fed to increase or decrease reserves rapidly, any single asset being used to conduct monetary policy would see its supply change drastically and suffer a large asymmetric shock as compared to the economy as a whole. All of these concerns arise in the case of GSE debt issued by Fannie Mae and Freddie Mac, notwithstanding their efforts to increase the liquidity of their issues.

Another among a wide variety of possibilities to replace Treasuries in the conduct of monetary policy, if the Fed were granted the authorization to use them, would be newly created private securities. If the demand were there, for example, private institutions could construct very low-risk securities constructed from a pool of private debt securities. Such securities would be packaged in a way similar to mortgage-backed securities currently issued by GSE's, but would

[Comment JG11]:<sup>14</sup> See Reinhart and Sack (2000) for one reference.

[Comment JG12]:<sup>14</sup> Suggest putting this footnote somewhere in the borrowing section, as opposed to "monetary" section.  
done JSS

not be as liquidity constrained and would be better diversified against certain market risks. To package the new instrument, a financial institution could purchase a set of high-quality corporate bonds. It could then offer to sell a "triple-A-plus" bond, with regular interest payments and a fixed annual interest rate for the life of the bond. The institution would put up its equity capital and take on the default risk of the underlying corporate bonds. Although not completely risk-free, such triple-A-plus securities would entail limited credit risk and would be close substitutes for Treasury securities. To the extent that the market valued such an instrument, especially in the absence of a large supply of Treasuries, a liquid and transparent market could well develop.

*Alternative monetary policy instruments.* Open market operations are the main instrument for conducting monetary policy, but there are other, less widely used instruments that could be considered. These include use of the discount window, changes in reserve requirements, and even moral suasion.

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